

Heather Eradication Technical Supplement

Our Experimental Model is a Randomised Complete Block Design, with a model of:

$$Y_{ij} = E(y_{ij}) + b_i + e_{ij}, \quad b_i, e_{ij} \sim N(0, \sigma^2)$$

- i* represents the block number
j represents the unit number within a block
b_i represents the effect of block *i*
e_{ij} represents the effect of unit *j* within block *i*

The model output from the 2-way ANOVA with blocking factor of ‘blocks’, treatment factor of ‘*Treat*Year*’ and response variable ‘*Heather*’ is found below.

ANOVA summary

```
Error: Block.cat
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals  5 0.2598 0.05197

Error: Within
      Df Sum Sq Mean Sq F value Pr(>F)
Treat      3 2.6914  0.8971 151.25 <2e-16 ***
Year.cat    3 1.8930  0.6310 106.38 <2e-16 ***
Treat:Year.cat  9 1.3563  0.1507  25.41 <2e-16 ***
Residuals    75 0.4449  0.0059
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

For each of, *Heather*, *Native Monocots*, *Native Dicots*, *Exotic Monocots* and *Exotic Dicots*, the same analysis as above was conducted, which found statistically significant p-values for the interaction between *Treat* and *Year* variables. Therefore, it was the interaction tables of means that were of most interest to our analysis for all variables.

The tables of means and Least Significant Differences (LSD) are tabulated, at the 0.05 level of significance for all 5 variables.

The LSD is calculated through:

$$LSD = t \times \sqrt{2 * \frac{ResMS}{reps}}$$

Where ResMS is the Residual Mean Squares or estimate of $\hat{\sigma}^2$, and reps is the number of replicates.

Heather				
Treat:Year.cat Year.cat Treat 2008 2009 2010 2012 B 0.5445 0.0238 0.0070 0.0165 C 0.4915 0.5592 0.5512 0.5887 H 0.4627 0.3728 0.0517 0.0715 HB 0.5142 0.0030 0.0007 0.0065 LSD: 0.1728511				
Native Monocots				
Treat:Year.cat Year.cat Treat 2008 2009 2010 2012 B 0.03150 0.04017 0.04500 0.08617 C 0.05150 0.04633 0.04683 0.05433 H 0.05567 0.06750 0.07400 0.16617 HB 0.05817 0.06717 0.11367 0.17050 LSD: 0.07068566				
Native Dicots				
Treat:Year.cat Year.cat Treat 2008 2009 2010 2012 B 0.10650 0.13150 0.12467 0.17100 C 0.09083 0.09517 0.09867 0.09283 H 0.07100 0.07417 0.04333 0.05000 HB 0.10500 0.08750 0.04983 0.03767 LSD: 0.09722534				
Exotic Monocots				
Treat:Year.cat Year.cat Treat 2008 2009 2010 2012 B 0.01850 0.02400 0.04367 0.16817 C 0.01667 0.01917 0.02167 0.03383 H 0.01817 0.02583 0.03550 0.16600 HB 0.01633 0.02683 0.05467 0.21317 LSD: 0.08177825				
Exotic Dicots				
Treat:Year.cat Year.cat Treat 2008 2009 2010 2012 B 0.04167 0.05717 0.05767 0.08517 C 0.03500 0.03850 0.03450 0.03233 H 0.02767 0.00700 0.00300 0.00783 HB 0.02983 0.00633 0.00500 0.01350 LSD: 0.03123				